

REMARKS

These remarks and the accompanying amendments are responsive to the Office Action made final and dated May 2, 2007 (hereinafter referred to as the "Office Action"), and in response to the subsequent Advisory Action. At the time of the last examination, Claims 5-10 were pending, of which Claims 5, 7 and 9 are independent claims, and Claims 6, 8 and 10 are corresponding dependent claims.

The Office Action rejects all of the claims 5-10 under 35 U.S.C. 102(b) as being anticipated by United States patent number 4,972,439 issued to Kuznicki et al. (the patent hereinafter referred to as "Kuznicki"). The applicants respectfully traverse, and request reconsideration in light of the following remarks.

Novelty and non-obviousness of claims 5-10 over Kuznicki

An object of claims 5-10 is "to optimize a trade-off between degradation in accuracy of coherent detection due to a reduction of the number of the pilot symbols and an increase in overhead due to the increase of the number of pilot symbols" (please see paragraph [0006] of the specification of the present application). That is, if the ratio of the number of pilot symbols to the total number of symbols is increased, the accuracy of the coherent detection is improved, but the number of data symbols that can be transmitted is reduced.

It is clear from paragraphs [00227] to [00230] of the specification and Figures 5 and 6 of the present application that the optimum number of pilot symbols (in view of the system capacity) varies depending on the symbol rate. In order to deal with such situation, claims 5-10 feature that the ratio of the number of pilot symbols to the total number of symbols is made to be a value responsive to the transmission rate.

Kuznicki disclose a mechanism regarding a transmitter which transmits the encoded message to the mobile communication receiver such as pager. As shown in Figure 1, the transmitter control signals and the message information formatted by the system controller 20 are provided for the transmitters 22, ... 22' and the encoded messages are transmitted to the receivers 26, 26' and 26''. The transmitter control signal and the message information consist of "SYNC 1", "SYNC 2 (S2)" and "address/data frames". "SYNC 1" consists of "idle codeword" and "word 1-4 codeword" (please see column 4, lines 18-21). When "SYNC 1" is provided for the transmitters 22, ... 22', first of all, the transmitters 22, ... 22' detect "idle codeword", and then detect "word 1-4 codeword" (please see column 8, lines 12-18). "Word 1-4 codeword" is used for controlling the data bit rate of the transmitters 22, ... 22' (please see column 4, lines 36-44 and Figure 2B).

Although "SYNC 1" is transmitted from the transmitters 22, ... 22' to the receivers 26, 26' and 26'', Kuznicki does not disclose how "SYNC 1" is used in the receivers 26, 26' and 26''. As for "SYNC 2", it is described that "SYNC 2" is provided for the transmitters 22, ... 22', and then transmitted from the transmitters 22, ... 22' to the receivers 26, 26' and 26''. However, Kuznicki does not disclose how "SYNC 2" is used in the transmitters 22, ... 22' and in the receivers 26, 26' and 26''.

"SYNC 1" is always transmitted at 1200 bps, and "SYNC 2" and "address/data frames" are transmitted at one of three data bit rates: 1200, 2400 or 4800 bps (please see column 3, line 63 to column 4, line 2).

Claims 5-10 generates a signal such that the ratio of the number of pilot symbols to the total number of symbols becomes a value responsive to the transmission rate of the signal.

In contrast, Kuznicki discloses neither the above-mentioned object of claims 5-10 ("optimizing a trade-off between degradation in accuracy of coherent detection due to a reduction of the number of the pilot symbols and an increase in overhead due to the increase of the number of pilot symbols") nor means for accomplishing such object ("the ratio of the number of pilot symbols to the total number of symbols is made to be a value responsive to the transmission rate").

The Office Action states that "SYNC 1" and "SYNC 2" of Kuznicki correspond to "pilot symbols" of claims 5-10 (page 2, line 16 of the Office Action).

In Kuznicki, as for "SYNC 1", there is no description that the number of bits of "SYNC 1" varies, when "SYNC 2" and "address/data frames" (which follow "SYNC 1") vary between 1200, 2400 and 4800 bps. That is, the trade-off problem described in the present application that "if the ratio of the number of the pilot symbols to the total number of symbols is increased, the number of the data symbols that can be transmitted is reduced" does not occur in Kuznicki et al. As for "SYNC 2", there is also no description in connection with "SYNC 2" which discloses or suggests such trade-off problem. For example, there is description that "the second synchronization codeword is thirty-two bits at 1200 bits per second and is correspondingly a greater number of bits at the higher data bit rates".

Accordingly, this description of Kuznicki does not disclose nor suggest the above-mentioned feature of claims 5-10 that "the ratio of the number of pilot symbols to the total number of symbols is made to be a value responsive to the transmission rate". Rather, this description gives the suggestion (teaching away) which goes away from claims 5-10, i.e. the suggestion that "SYNC 2" increases in proportion to the rate, and therefore the ratio of the number of "SYNC 2" to the total number of symbols does not vary.

Thus, claims 5-10 have novelty and non-obviousness over Kuznicki et al which do not disclose a feature of claims 5-10, i.e. "generating a signal such that the ratio of the number of pilot symbols to the total number of symbols becomes a value responsive to the transmission rate of the signal".

Further, in Kuznicki, since there are two rates (the rate of "SYNC 1" and the rate of "SYNC 2" and "address/data frames"), "the transmission rate of the signal" cannot be identified, and therefore it cannot be said that "a signal is generated such that the ratio of the number of pilot symbols to the total number of symbols becomes a value responsive to the transmission rate of the signal" (emphasis added).

Thus, also from this point of view, claims 5-10 have novelty and non-obviousness over Kuznicki.

Further Novelty and non-obviousness of claims 5-6 over Kuznicki et al

In the receiving side (reception apparatus), claims 5 and 6 carry out coherent detection by using the pilot symbols included in the received signal.

The Office Action states that "SYNC 1" and "SYNC 2" of Kuznicki et al correspond to "pilot symbols" of claims 5 and 6 (page 2, line 16 of the Office Action).

However, as we mentioned above, Kuznicki does not disclose how "SYNC 1" and "SYNC 2" is used in the receivers 26, 26' and 26''. Further, Kuznicki does not disclose that "SYNC 1" and "SYNC 2" are signals for coherent detection such as pilot signals of claims 5 and 6.

Thus, also from this point of view, claims 5 and 6 have novelty and non-obviousness over Kuznicki which do not disclose a feature of claims 5 and 6, i.e. "carrying out coherent detection by using the pilot symbols included in the received signal".

Accordingly, the rejection should be withdrawn, and favorable action is respectfully requested. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

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Respectfully submitted,

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